State of Rhode Island
Department of Environmental Management
Office of Air Resources

File No. 03-01

In Re: **Adoption of amendments to Regulation No. 9, "Air Pollution Control Permits" and Regulation No. 22, "Air Toxics"**

DECISION

Introduction

On 20 October 2003 a notice was published in the Providence Journal-Bulletin and was mailed to interested parties announcing a public hearing and comment period to accept comments on the proposed adoption of amendments to Air Pollution Control Regulations No. 9, "Air Pollution Control Permits" and No. 22, "Air Toxics." The public hearing was held on 20 November 2003 in Room 300 of the Department of Environmental Management Building, 235 Promenade Street, Providence, Rhode Island. The public comment period was extended at the hearing until 4:00 PM on 11 December 2003.

The proposed amendments to Regulation No. 22 would add all of the Federal Hazardous Air Pollutants, as well as several other pollutants of potential concern, to the list of Air Toxics in the regulation, update the Acceptable Ambient Levels (AALs) for listed Air Toxics, and clarify permitting requirements. Dry cleaning requirements would be removed from that regulation. The proposed amendments to Regulation No. 9 would make that regulation consistent with the amended Regulation No. 22. The Air Toxics Operating Permit requirements currently in Regulation No. 9 would be removed from that regulation and consolidated with other requirements related to those permits in Regulation No. 22.

Decision

It is the decision of the Hearing Officer to adopt the proposed amendments to Air Pollution Control Regulations No. 9, "Air Pollution Control Permits" and No. 22, "Air Toxics" modified as discussed in the response to comments that follows. The final amended regulations are appended to this Decision.

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Date Stephen Majkut,
Hearing Officer

Approved:

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Date Frederick J. Vincent
Interim Director

Response to Comments

This section will present the Rhode Island Department of Environmental Management's (RI DEM's) response to the comments received at the public hearing and during the public comment period. Each comment has been paraphrased and is followed by RI DEM's response. Similar comments have been grouped together. A list of commenters is attached.

General Comments

Comment: What is "Calculated Acceptable Ambient Level (CAAL)", a term which is defined in 9.1.8 and used in 9.3.3(a)(2)? (Teknor Apex Co. (Teknor))

Response: A CAAL is an ambient impact limit for a substance not listed as an air toxic in Regulations 9 and 22 and is derived using the same methods as those used to derive AALs for the listed substances. For existing sources, Regulation 22 addresses the impacts of only the listed toxic air contaminants but, for new sources, Regulation 9 regulates the impacts of all pollutants, including criteria pollutants, listed air toxic contaminants and other substances. Note, however, that, since many additional pollutants will now have Regulation 22 AALs, the use of this procedure will be greatly reduced. This will promote consistency in permit evaluations.

Comment: The paragraphs under section 22.5.3 are misnumbered. (Teknor)

Response: This typographical error has been corrected.

Comment: Would a source that did not require a permit to construct, install or modify previously but would according to the new regulation be required to get a permit if construction was underway but it was not yet operating? (WC)

Response: A source for which a negative applicability determination was made previously and which is already under construction would be considered an existing source and would not be required to get a permit to construct, install or modify. Such a source would be subject to supply annual emissions information and to submit an ATOP application if notified by RI DEM.

Comment: EPA Region I strongly supports the expansion of the list of air toxics in Regulation 22 as well as the proposed reevaluation of this list and their AALs and MQs every two years. (EPA Region I (EPA))

Response: RI DEM appreciates EPA's support.

Comment: Section 22.3.4(a), which allows an area to be excluded from an impact analysis if there is a demonstration that that area is not accessible to the public will encourage facilities to strengthen security. (EPA)

Response: Although tightened security was not the reason for adding this language, some facilities may choose that avenue in order to keep the public away from areas with the highest potential impacts.

Comment: Workers should have the same protection as the general public in regards to emissions of air toxics. (EPA)

Response: While RI DEM agrees that workers should be protected, RI DEM does not have jurisdiction over occupational exposures; therefore, the regulation applies to members of the public but not specifically to workers.

Comment: The quality of information on MSDS sheets is often not sufficient to determine what is actually in a product but, if users are required to request more accurate information, the quality might improve. (EPA)

Response: Section 22.4.3 requires facilities to request further information from manufacturers who claim that the content of their products is proprietary. This may improve the information on the MSDS sheets in the future.

Comment: RI DEM is proposing to remove the word "imminent" from section 22.5.6 and instead say that an ATOP will be denied if "one or more listed toxic air contaminants present a~~n imminent~~ threat to the surrounding community." "Imminent" is a term understood to mean severe and/or immediate. Without that qualifier, determining threat becomes too subjective. The term "imminent" should be reinstated and defined in the regulation. (Clariant)

Response: RI DEM agrees with the comment and has replaced the word "imminent" in section 22.5.6 and added a definition of the term "imminent threat" as 22.1.9.

Applicability

Comment: The proposed regulation states that major fuel-burning sources will be evaluated in the future, while non-major sources are exempt from the regulation. However, the definition of "major source" is based on criteria pollutant as well as air toxics emissions. The definition for major source, as it is used in this regulation, should not include the criteria pollutants CO, SO_2 and NOx as these pollutants are not relevant to this regulation. (GZA GeoEnvironmental for the RI Resource Recovery Corporation (RIRRC))

Response: The major/minor source delineation is here used as an indicator of the size of a fuel-burning source. Regulation 22 would be applicable to major fuel sources after five years, but those sources would then be ranked along with other source types in order to determine which sources would be required to submit Air Toxic Operating Permit (ATOP) applications. As discussed above, the ranking is on the amount and toxicity of air toxics emitted from the source. Therefore, a major fuel-burning source, although subject to the ATOP submittal requirement after five years, may never be required to submit an ATOP application. Further, if such a source was evaluated by the ATOP process, it likely would meet the AALs without need for reductions in impacts. RI DEM believes that this approach is fair and the regulation was not amended in response to this comment.

Comment: The exemption of fuel burning equipment used to generate heat that is in the current regulation should be reinstated. Requiring a facility to switch to natural gas creates an unfair financial burden. (Clariant)

Response: The original regulation exempted operations that burn fuel solely for the purpose of producing heat, but did not exempt other fuel-burning operations, e.g. those that produce steam or electricity. Members of the stakeholders' group suggested that, if the regulation is to be applicable to some but not all fuel-burning sources, the delineation between covered and non-covered sources should be based on the quantity of emissions, as a surrogate for the potential for adverse air toxics impacts, rather than on the end-use of the energy produced by the combustion (e.g. heat versus electricity). RI DEM agreed to use that approach in the current proposed amendments by exempting minor fuel-burning sources and including major fuel-burning sources in the process after a five-year period.

With this delineation, a source that does not wish to undergo an ATOP evaluation for its fuel-burning operations could accept a cap on its oil consumption that would keep its actual emissions below the major source threshold. Most facilities have dual fuel (oil and natural gas) capabilities and the mix of fuels burned at a particular facility in a given year at a facility varies depending on a variety of factors, including price and availability. Accepting a cap or undergoing an ATOP evaluation would necessitate the consideration of an additional factor in determining that mix, but would not require the wholesale switch of fuel from oil to natural gas. The regulation was not changed in response to this comment.

Comment: It is unfair and unnecessary to require a facility or process that has been found to be in compliance with the BACT requirements in Regulation 9 to go through the ATOP evaluation process. (RIRRC)

Response: BACT is defined in terms of available technology and generally addresses specific processes or equipment at a facility. The ATOP process, on the other hand, evaluates the potential health effects of the ambient air concentrations of toxics emitted by an entire facility. It is possible for a facility that has BACT level emission controls to have ambient impacts that could violate AALs and thus have the potential to cause health impacts. Therefore, it is appropriate and important that these sources not be excluded. Note, however, that, if emissions have already been minimized at a facility, that facility is less likely to be a high priority source for requiring an ATOP and, if an ATOP application is required, it is less likely that additional reductions will be necessary. The regulation was not changed in response to this comment.

Comment: Do the exemptions in 22.2.2(b) and (d) for gasoline filling stations and perchloroethylene emissions from perchloroethylene dry cleaning facilities, respectively, need clarifications as to what other rules pertain to them, as is done for asbestos and lead sources? (EPA)

Response: The regulation was not changed in response to this comment. All perchloroethylene dry cleaning facilities are subject to Regulation 23, but very small gasoline dispensing stations are not subject to the Stage II requirements in Regulation 11. Explaining applicability requirements of other regulations in this regulation would make the regulation unnecessarily complicated.

Comment: "Fluorides and compounds, including Hydrogen fluoride" are listed as air toxics. Does this include fluorine-containing compounds that are not fluorides? (Woodard & Curran (WC))

Response: This category includes other fluorides, such as sodium fluoride, but not non-fluoride fluorine-containing compounds, such as freons. Since the MQs are defined by emissions rather than use, if a fluorine-containing compound is combusted to form fluorides which are then emitted, that emission would be regulated. The regulation was not changed in response to this comment.

Comment: Does the listed category "Bromates, including Potassium bromate" include any compound containing Br, such as Bromophenylmethane? The CAS number used for this category, 1554154 is for Br, which is known as bromate. (WC)

Response: Bromate is BrO_3^- and is usually found as the anion in the potassium or sodium salt. This category does not include Br compounds that do not have this anion. The CAS number in the regulation is the one used in the EPA and California toxicity databases which were used to derive the AALs for this substance. To avoid confusion, the CAS numbers for listed classes of compounds have been removed from the tables in the regulations.

Comment: There is a conflict between the 5 tpy permitting threshold for lead in section 9.3.1(d) and the much more stringent MQ in Appendix A of Regulation 9. (ESS)

Response: In response to this comment, section 9.3.1(d) (the 5 tpy permitting threshold for lead) was removed. This change resulted in renumbering sections 9.3.1(e), (f), (g) and (h) and the references to those sections in 9.3.2(a).

Comment: Laboratories should be exempt unless they are major sources in-and-of themselves. The Title V program designates laboratories as "Insignificant Activities." (Clariant)

Response: Laboratories were exempted from Title V primarily because processes run in research and development laboratories vary considerably from year to year and thus including them in the Title V program would necessitate repeated reopening of operating permits. Laboratories were not exempted in the existing Regulation 22 and there are no additional responsibilities for laboratories proposed here. In many cases, emissions from laboratories are not significant and, in those cases, an ATOP would not limit those emissions. However, air emissions from laboratories are not specifically regulated by other Rhode Island air pollution control regulations, as are the exempted source categories, and there is a potential for significant emissions of toxics from some laboratories. Therefore, it is appropriate that Regulation 22 does not exempt this source type. The regulation was not changed in response to this comment.

Comment: Facilities that are subject to MACT requirements are already saddled with a regulatory burden. Further, those facilities may be subject to additional requirements associated with residual risk requirements. MACT subject sources should therefore be exempted from the Rhode Island program. (Clariant)

Response: The federal Clean Air Act sets a emissions control floor for the MACT standards for existing sources as the control level that has been achieved by the lower end of the best controlled 12% of facilities of that source type. Although the Act allows individual MACTs to reflect a higher level of control, most of the MACT standards were set to correspond to this minimum standard and, as such, are not technology-forcing. Health risk is not considered when establishing the MACT standards, although, as the commenter stated, the Act does direct that an evaluation of residual risk after the installation of MACT controls be accomplished by 8 years after the promulgation date of the standard. Pursuant to this requirement, EPA has begun to evaluate the residual risk associated with some of the first MACT source categories. This

process has been delayed many times and, for most categories, will involve the evaluation of selected facilities in a source category rather than the impacts of every facility within a source category.

Rhode Island has taken a different approach to mitigating the adverse impact from air toxics emissions beginning with the promulgation of Regulation 22 in 1988. Rhode Island is a densely populated state. In many parts in the State, industrial air pollution sources are located in close proximity to residential areas. Therefore, RI DEM believes that it is crucial for health risk to be evaluated upfront and that that evaluation focus on the impacts of individual facilities on the general public at or beyond the source's property line. A facility that has reduced its emissions to comply with a MACT standard will, as a consequence of those reductions, be lower in the priority order for submission of an ATOP application that it would otherwise be and may not have to install additional controls. However, if an ATOP evaluation shows that, despite complying with MACT, that facility continues to cause ambient impacts off property that exceed health benchmarks, RI DEM believes that it is appropriate that that facility be required to implement additional measures to reduce those impacts. The regulation was not changed in response to this comment.

Air Toxic Operating Permits (ATOPs)

Comment: The procedures for prioritizing sources for ATOPs should be put in the regulation rather than the guideline and should be limited to objective parameters, rather than including public perception. (RIRRC)

Response: The proposed amended "Rhode Island Air Toxics Guideline" (the Guideline) establishes a prioritization scheme which is primarily based on objective criteria (quantity and toxicity of emissions). However, the scheme does allow for a shift of a source to a higher priority position in consideration of such factors as neighborhood concern about odors and/or health impacts. RI DEM believes that this is an appropriate approach. Neighbor concerns about emissions from a facility often cannot be adequately addressed without a thorough evaluation of the impacts of a facility, such as would be done through the ATOP process. If the source is evaluated and found to not have the potential to cause significant health impacts, no further action would be required by the facility and neighbors' anxiety about those impacts may be reduced.

RI DEM agrees that requirements applicable to the regulated community, including the Acceptable Ambient Level (AAL) impact standards and the Minimum Quantity (MQ) applicability thresholds, must be in a regulation rather than in a guideline. The ATOP prioritization scheme does not fall in that category, in that it provides guidance to RI DEM for addressing the highest impacts first, but is not applicable to regulated facilities. Including the prioritization scheme in the Guideline is a way of making RI DEM procedures transparent to the regulated community so that it is clear what criteria are used to establish a priority order.

The regulation was not changed in response to this comment.

Comment: Sixty days is insufficient time for a complex source to prepare an ATOP application. Ninety days is more appropriate. (RIRRC) Sixty days is insufficient time to submit an ATOP application because they require compilation of design data, which may not be readily accessible, and air dispersion modeling. One hundred twenty days is appropriate. (Clariant)

Response: For most sources, 60 days has been sufficient time to prepare an ATOP application. If a source is actively working on its application but requires additional time, RI DEM has liberally granted extensions. Although these procedures have worked well in the ten years that the program has been in effect, a sentence was added to section 22.5.2 that states that "the Department shall allow a facility additional time to submit the application if the owner or operator demonstrates to the satisfaction of the Department that such an extension is necessary."

Comment: If a facility is modifying equipment, does section 22.3.3(a) mean that the whole facility have to be in compliance with the AALs, or just the modified equipment? (Teknor)

Response: Emissions from the entire facility of the pollutants associated with that equipment must be considered.

Comment: What does "cause an increase" mean in 22.3.3(a) – an increase over zero or an increase over pre-modification ambient concentrations? (Teknor)

Response: The AALs consider the total impact of emissions from a facility, but do not include consideration of concentrations of a pollutant in the background air or concentrations caused by emissions from other sources. For permits to construct, install or modify, as well as for ATOPs, compliance is determined by comparing the ground level impact from the facility, as determined by modeling the emissions of the listed pollutant from the entire facility with the AALs. Pre-modification impacts are not considered. In response to this comment, the terminology used in 22.2.2(a) and (b), 22.5.3(a) and (b), 9.3.3(a)(2) and 9.4.2(g) was clarified to specify that it is a facility's impacts that are being compared to the AALs. A definition of the term "impact" was added to Regulation 22.
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Comment: If a company received an ATOP and then increased emissions of a substance not included on the ATOP in a subsequent year, would they have to revise the ATOP? (Teknor)

Response: If the increase in emissions is greater than the MQ, the company would have to apply for and receive a permit to construct, install or modify before the increase occurs. If the increase is less than the MQ but the total emissions of that substance then exceeds the MQ, the

company just needs to report it on their yearly emissions inventory. RI DEM would then have the option to either reopen the ATOP or wait until the ATOP has expired to incorporate that substance into the permit.

Comment: Section 22.5.7(f) allows RI DEM to include in an ATOP conditions "to ensure compliance with State and Federal air pollution control rules and regulations applicable to processes at the facility that emit listed air toxic contaminants." Since the State program is risk based, technology-based requirements, such as those in MACT standards, should not be included in ATOPs. RI DEM must not specify the technology that a facility uses to meet fence line standards. (Clariant)

Response: Regulation 22 does not require particular technological solutions for achieving compliance with the AALs. However, where a facility has chosen a particular option to comply with the AAL, it may be necessary to include specific conditions in the ATOP to ensure continuing compliance with the regulation. Moreover, when a facility is subject to a MACT standard for a particular process that emits air toxics, it may be necessary, to avoid confusion, to include some of those specific requirements in the ATOP. This is particularly important for area source MACT categories which, at least at this point, have not been required to get Title V permits and thus do not have all of the air pollution control requirements relevant to a particular process listed in one document.

Recordkeeping and Reporting

Comment: Section 22.4.2(c) requires facilities subject to the regulation to submit, for each listed toxic emitted in a quantity greater than the MQ for that substance, information on the amount of that substance used by the facility in the previous year as part of the annual registration. Use information should not be required because it is unnecessary and may be confidential. (Clariant)

Response: Although all thresholds are now in terms of emissions rather than use, knowing the quantity used and the method that was used to calculate emissions is often necessary for RI DEM for verifying the estimated emissions. Use information is currently requested on our emissions inventory forms for this reason. If a facility requests that the use information be kept confidential, RI DEM has and will honor that request. The regulation was not changed in response to this comment.

Comment: Usage information has been submitted annually under EPCRA section 311 and 312 for nearly 15 years. It is duplicative to require the same information to be submitted by this rule. If RI DEM retains this requirement in the rule, it should provide justification for the duplication according to the specifications of the Administrative Procedures Act (APA) and that justification must be made available for public review and comment. (Clariant)

Response: The Administrative Procedures Act (APA) does not apply to this situation for the following reasons: (1) The APA requires an agency to identify and justify an overlap or duplication of any new regulation – this is a proposed amendment of an existing regulation, (2) the APA applies to overlapping or duplicated State regulations and EPCRA is a Federal requirement and (3) EPCRA sections 311 and 312 require the reporting of the maximum and average quantity of a substance stored on site – information that is necessary for appropriate emergency response, while Regulation 22 instead requires the reporting of annual usage and emissions information – information that is necessary for determining compliance with Regulation 22.

Comment: In the February 2003 draft of the response to comments on the 2002 proposed amendments, RI DEM stated that "The relationship between Regulations 14 and 22 reporting will be clarified in the regulations." This was not done. Any clarification should be incorporated in the rules and be subject to public comment. (Clariant)

Response: The above language was a draft response to a comment that stated that the registration requirement should reference Regulation 14 if section 22.4.1 is part of the annual emission statement submittal. After looking into this issue further, RI DEM modified its response to that comment to say, in the Response to Comments appended to the Decision document on the earlier proposed amendments, the following:

> Some, but not all, of the air toxics sources are required to file emissions statements. However, all identified Regulation 22 applicable sources will be sent inventory forms every year with a cover letter that clearly states that completing these forms fulfills the Regulation 22 registration requirements as well as registration requirements in other Air Pollution Control regulations. This procedure has worked well in the past. If a facility that is Regulation 22 applicable has not been identified by RI DEM and does not receive an inventory, that facility is still required to register.

Thus, sources are mailed an inventory form each year along with an accompanying letter that explains which regulatory requirements the form fulfills.

Minimum Quantities (MQs)

Comment: Switching the MQs from a use or generation basis to an emissions basis will prevent wasteful expenditures on facilities that have low emissions. (American Chemistry Council (ACC))

Response: RI DEM agrees that this change has strengthened the regulation and lightened the potential burden on some small emitters.

Comment: The Minimum Quantity lists in Regulations 9 and 22 are virtually identical. Why not just have one list? That would eliminate future discrepancies. (Teknor)

Response: The table in Regulation 9 also identifies federal HAPs; that identification is necessary because the Regulation 9 permitting requirements include a 25 ton threshold for total HAPs, as well as the thresholds for the individual toxics identified in the table. Although having the list in two regulations means that both regulations will have to be amended when the list is updated, the repetition eliminates the need for the regulated party to look at more than one regulation when determining applicability. The proposed regulation was not modified in response to this comment.

Comment: There are some inconsistencies in Regulation 22 between the lists of toxic air contaminants in the lists of AALs (Table I and II) and the list of MQs in Table III. Table III lists "antimony & compounds, including antimony trioxide" and "chromium VI-mists & aerosols and solid particulate" while the other tables list antimony separately from other antimony compounds and chromium VI mists and aerosols separately from chromium VI solid particulate. Further, Table III lists a MQ for total, as well as certain specific, glycol ethers, but there are AALs in Tables I and II only for the specific glycol ethers, not for the general class. (Teknor)

Response: Antimony trioxide has the same 24-hour AAL as the other antimony compounds, but also has an annual average AAL because the trioxide, unlike the other antimony compounds, is listed by the International Agency for Research on Cancer (IARC) as "possibly carcinogenic to humans" (Group 2B). Therefore, it is separated from the other compounds in the AAL tables, Tables I and II. However, since the MQ for the trioxide, as well as for the other antimony compounds, is based on the 24-hour AAL, there is no reason to separate out the trioxide in Table III.

Similarly , chromium VI mists and aerosols have a different 24-hour average AAL but the same annual average AAL as chromium VI particulate. In this case, the MQ is based on the annual average AAL, and so is the same for both forms of chromium VI.

RI DEM agrees that the MQ for total glycol ethers should not be included in Table III of Regulation 22. That MQ is included in the Regulation 9 applicability thresholds, because the

EPA HAP list includes total glycol ethers as a class. However, including that MQ in Regulation 22 without corresponding AALs could result in a situation in which a facility is subject to the regulation but there are no criteria specified to evaluate the impacts from that facility. Total glycol ethers has been removed from Table III in response to this comment.

Comment: The process described in the Guideline to derive MQs is overly conservative. The annual average AAL should be weighted more heavily than the AALs for the other averaging times in the derivation because the MQs are for an annual period. (Teknor)

Response: When RI DEM proposed amendments to Regulations 9 and 22 in 2002, the proposed amendments included MQs in pounds per hour, pounds per day and pounds per year, to correspond to the AALs for those averaging periods. Commenters stated that the recordkeeping necessary to determine maximum hourly and daily, as well as annual, emissions of each toxic air contaminant was overly burdensome. RI DEM agreed it would be easier for sources to maintain annual records, but still believed that it was important to consider the shorter-term AALs, which are also significant health benchmarks, when setting the MQs. The procedure outlined in the Guideline is an attempt to integrate these two concerns, i.e. to derive annual average MQs that consider shorter-term as well as chronic health effects. The regulation and guideline were not changed in response to this comment.

Comment: The Guideline states that "Facilities which use or emit the listed substances in quantities at or above the MQ levels are subject to the Air Toxics Operating Permit requirements." This should be changed to be consistent with the proposed amendments, which apply the MQs to emissions, not use. (Clariant)

Response: This language, in the MQ derivation section of the Guideline, has been revised in response to this comment.

Procedures for Deriving Acceptable Ambient Levels (AALs)

Comment: The AALs appear to be too conservative when compared to occupational limits (e.g. for aniline, antimony, 1,3-butadiene and naphthalene). Teknor

Response: Occupational limits are not appropriate for evaluating ambient air exposures applicable to the general public, because they apply to healthy working-age adults rather than the general population (which includes the elderly, children and people with comprised health) and because they assume that a person is exposed for only eight hours per day, five days per week. Before the EPA and other agencies derived health benchmarks for ambient air exposure for the general population, some states attempted to derive ambient criteria by dividing occupational limits by safety factors that accounted for the potential for continuous exposure and for the exposure of sensitive individuals. Now that health benchmarks specifically designed for

evaluation of ambient exposures are available for many substances, those benchmarks are generally considered more appropriate than the modified occupational levels for this purpose. Note also that NIOSH has designated two of the substances mentioned, aniline and 1,3-butadiene, as potential carcinogens and, as such, recommends that workplace levels of those substances be limited to the "lowest feasible concentration." The regulation and guideline were not changed in response to this comment.

Comment: Using EPA Reference Concentrations and Reference Doses (RfCs and RfDs) to establish 24-hour average limits is inappropriately conservative. RI DEM should use the RfCs/RfDs with an annual average, use a different basis for deriving the AALs or evaluate the most appropriate averaging time on a case-by-case basis. (RIRRC) The RfCs and RfDs are chronic (lifetime) values and are analogous to the chronic Minimum Risk Levels (MRLs) developed by the Agency for Toxic Substances and Disease Registry (ATSDR) and the chronic Reference Exposure Levels (RELs) developed by California (CAL) that RI DEM is using for annual values. The RfCs and RfDs should not be used as 24-hour average AALs unless appropriate factors are used to adjust the lifetime value to a 24-hour value. (ACC)

Response: EPA's IRIS database states that "the RfC is an estimate . . . of a **daily** inhalation exposure of the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime." (emphasis added) While it is clear the EPA considers these values to be protective for long-term exposure, the above statement does not imply that it is appropriate to average exposures over the course of a year, but instead refers to these concentrations as daily exposures. For instance, a RfC of 50 $\mu g/m^3$ implies that exposure to that concentration day in and day out over the course of a year or a longer period is unlikely to cause health effects. It does not imply that exposure to a 350 $\mu g/m^3$ concentration of that substance one day per week for a year would be health protective, yet, if the RfCs are adopted as annual averages, both of these scenarios would be allowed. In contrast, both CAL and the ATSDR clearly specify the averaging period associated with their benchmarks.

RI DEM agrees that, for some RfCs, an annual averaging time is appropriate but did not have the necessary resources available to independently determine for which substances this is the case, and so proposed 24-hour averages for all RfCs. However, in response to this comment, RI DEM has reevaluated the averaging times applied to RfCs used to develop the AALs by comparing those values with subchronic and chronic benchmarks derived by CAL and the ATSDR. RfCs were assigned annual averages if they met all of the following criteria:

- CAL OEHHA and/or ATSDR have set a chronic benchmark for the substance which is the same as or lower than the RfC. If both CAL and ATSDR chronic benchmarks are available, both must be the same as or lower than the RfC.

- If an ATSDR subchronic REL is available for the substance, it is higher than the RfC.

- The RfC is not based on developmental effects. RfCs for developmental effects do not

include subchronic to chronic adjustment factors.

Of the 64 listed substances with RfCs, 27 met the above criteria and the AALs for those substances were changed to associate those RfCs with an annual average. Note that, for carcinogens the cancer-based annual average AAL was lower than the non-cancer value in most cases and thus took precedence. MQs were adjusted to correspond to these changes. RI DEM continues to use a 24-hour average for the remaining 37 RfCs. The criteria used to determine the averaging time for the RfCs is delineated in Table A below.

The averaging time associated with RfDs was not changed because the uncertainties inherent in extrapolation between exposure routes require the need for a conservative approach to these values. However, as discussed below, the method for using RfDs to develop AALs was modified in response to another comment.

Comment: Using a factor of 10 inter-route safety factor applied by RI DEM when converting oral RfDs to inhalation values is not appropriate. Many substances are absorbed and metabolized differently by inhalation than they are by ingestion. All available information should be used to derive AALs; a default method should not be used. (Clariant) As a general principle, no additional factor is necessary to adjust oral benchmarks to inhalation values; RI DEM's use of the factor of ten across the board is unjustified. (ACC)

Response: In response to this comment, RI DEM compared the RfCs and the RfDs, converted to an inhalation concentration, for the 25 substances for which both values were listed in IRIS. There was little correlation between the values; converted RfDs ranged from one-tenth to almost 10,000 times the RfC values for the same substances. This discrepancy remains even when the RfDs and RfC were compared only for substances for which the two benchmarks are based on the same health effect. RI DEM also searched the literature for support of the use of a factor of 10 adjustment for inter-route extrapolations and found that, when federal and state agencies use the RfDs to evaluate inhalation toxicity, they do not generally apply an additional safety factor. Since RI DEM did not find good justification for the use of this factor, it was removed from conversions of oral health benchmarks to AALs. Twenty four hour average AALs for substances with RfDs and/or intermediate oral MRLs but without RfCs or intermediate inhalation MRLs were recalculated by converting the more stringent of the two oral values, if both were available, to $\mu g/m^3$, assuming an inhalation rate of 20 m^3/day and a body weight of 70 kg, without an additional safety factor. RI DEM did not remove the inter-route safety factor for cadmium of 20, since cadmium is considerably better absorbed by inhalation than by ingestion. This procedural change resulted in modifications of several 24-hour AALs and MQs.

Comment: Using an additional safety factor of ten when deriving AALs for persistent bioaccumulative toxic (PBT) chemicals is not appropriate. Ambient impact is not a true indicator of deposition and related exposure pathways; a facility with high emissions and a tall stack may cause considerably more deposition than a smaller source with the same ambient air impacts. RI DEM already has a method for evaluating the most significant sources of PBTs, namely incinerators and large fuel burning facilities, by requiring a multipathway risk assessment. AALs for PBTs should be derived the same way as those for other toxics. (RIRRC)

Response: The multipathway risk assessment procedure referred to by the commenter applies to new and modified sources only, while Regulation 22 applies to existing sources also. A commenter on the earlier proposed amendments said that it is inappropriate to ignore the additional exposures that can result when air emissions of PBTs are deposited on land and water surfaces and accumulate in food products. RI DEM agrees, but believes that it would be overly burdensome to require all sources emitting a PBT to undertake an extensive multipathway assessment. The factor of ten approach is a workable method of taking into account the fact that air emissions of the PBTs result in exposures by routes other than inhalation, although it may under- or overestimate the magnitude of those additional exposures in some cases. The regulation was not changed in response to this comment.

Comment: The AALs as defined are protective of public health but would be even more so if they took into account background levels of pollutants in addition to emissions from the source. (EPA)

Response: RI DEM agrees that it would be more conservative to include background concentrations of listed air toxics when determining compliance with AALs. However, many of the most stringent AALs correspond to a one in one-million cancer risk level, which RI DEM believes is an appropriate level of risk for a source to contribute, regardless of background levels. The benchmarks used to derive AALs that are based on threshold health effects are conservatively derived and should, in most cases, be sufficient to protect public health, even without consideration of background levels. Note that Regulation 9, sections 9.3.3(a)(3) and 9.4.2(h) require sources to conduct additional analyses required by Rhode Island's Guidelines for Assessing Health Risks from Proposed Air Pollution Sources and meet the criteria specified in that document. Those guidelines enable RI DEM to look at issues such as the cumulative impact of several pollutants emitted by a source or of several sources emitting the same pollutant as well as multipathway exposure issues. The regulation was not changed in response to this comment.

Comment: RI DEM did not fulfill the requirements of the APA because it did not give full consideration to comments received on the amendments proposed in 2002. For example, additional sources were used to derive AALs for substances for which there were no EPA, ATSDR or CAL health benchmarks. (Clariant)

Response: The Decision on the previous proposed amendments, which was signed on 3

November 2003, addresses all significant comments received. All comments were carefully considered and an explanation was provided of why they regulation was or was not amended for this proposal in response to the comment. The procedures for deriving the AALs were subject to particular scrutiny in response to the comments and adjustments were made before the current amendments were proposed.

Comment: RI DEM is "adopting" hundreds of chemicals from lists from around the country. As an example, RI DEM responded to a comment concerning the AALs and MQs in the previously proposed amendments for propylene oxide, which were derived from EPA and CAL benchmarks by saying:

> The AALs for propylene oxide were based on the California acute REL (one-hour), the EPA RfC (24-hour) and the EPA cancer potency factor (annual), consistent with the methodology in the "Rhode Island Air Toxics Guideline." RI DEM and HEALTH are not equipped to reevaluate the benchmarks derived by those agencies; however, if the agencies who developed those benchmarks correct or update those values, RI DEM will change the AALs to correspond to those changes.

Therefore, the regulation merely piggybacks on other legislation without any evaluation of effects on Rhode Island residents. This is not allowed by the APA. (Clariant)

Response: The methodology for deriving the AALs establishes a protocol that utilizes health benchmarks derived by other nationally recognized agencies. The methodology and its application were presented for public comment according to the procedures in the APA. Many state regulations utilize technical material developed by federal agencies and the agencies of other states with more resources as the basis of their regulations; that practice is not precluded by the APA. This practice is particularly necessary in a small state like Rhode Island, which does not have the resources available to duplicate the investigations done by others. RI DEM believes its use of technical information derived by other states is a very prudent use of its resources and results in a regulation which, after public review and comment, is protective of the air resources of the State.

Comment: RI DEM should not adjust California's No Significant Risk Levels (NSRLs) by a factor of 10 when deriving AALs. (Clariant)

Response: NSRLs are equivalent to a life-time cancer risk of one in one-hundred thousand (10^{-5}), while RI DEM's Table I annual average AALs for carcinogens correspond to a cancer risk of one in one-million (10^{-6}). Therefore, when a NSRL was used as the basis for an AAL, it was divided by ten for Table I and used without adjustment in Table II. Note also that NSRLs are for total exposure by all exposure routes while AALs apply only to the inhalation exposure route. The regulation was not changed in response to this comment.

Comment: EPA itself has acknowledged that many IRIS values are outdated and that any state agency that uses IRIS values should consider all credible and relevant data in rulemaking. By using IRIS values without considering information that became available after the derivations of those values, RI DEM may be assigning AALs based on outdated information. The same is true for CAL and ATSDR benchmarks. (ACC)

Response: While it is true that some of the IRIS values were developed several years ago EPA still uses these values in many of its programs. As discussed above, RI DEM does not have the capacity to independently evaluate new toxicity data. However, as discussed above, RI DEM has agreed to look at the chronic health benchmarks derived by CAL and ATSDR when deciding whether a RfC should be used with a 24-hour or annual averaging period.

Comment: As RI DEM has acknowledged, there is no technical basis for adding additional safety factors to AALs based on noncancer effects for carcinogens for which quantitative cancer risk information is not available. To do so would be arbitrary and capricious. The annual average AALs for these substances should be based solely on chronic noncancer benchmarks. (ACC*)*

Response: In response to this comment, RI DEM compared the values of the noncancer subchronic/chronic benchmarks and the concentrations corresponding to 10^{-6} risk level for the 59 substances that RI DEM regulates as carcinogens for which both of these values were available. Although there was no direct correlation between the noncancer and cancer benchmarks, the cancer benchmark was more than ten times lower than the noncancer value for 92% of these substances, at least 100 times lower for 71% and at least 1,000 times lower for 29%. Therefore, it is probable that AALs for the carcinogens for which cancer potency information is not available would be 10 –100 times more stringent than the non-cancer values. For this reason, RI DEM believes that the use of a safety factor of 10 – 100 to noncancer benchmarks for carcinogens for which cancer potency information is not available is not overly stringent. In fact, to ignore the evidence that those substances are or are likely to be carcinogenic and to use the noncancer benchmark without any adjustment would not be protective in the vast majority of cases.

Note, however, that the number of substance that are being regulated in this manner has been reduced. For two listed substances in EPA Cancer Class 2B, 1,1-dimethylhydrazine and vinyl bromide, CAL NRSL values have become available and were used instead of the adjusted noncancer values. In addition, as discussed below, several substances in EPA Cancer Class C are no longer being regulated as carcinogens by RI DEM. This leaves only thirteen AALs that were derived using this procedure.

Comment: Cancer-based AALs should not be derived for chemicals classified as Group C by

EPA, since there is only weak evidence of carcinogenicity in animals and none in humans for these substances and these substances are generally not regulated based on a cancer hazard in other contexts. (ACC)

Response: In response to this comment, RI DEM further investigated the 23 listed air toxics that EPA has categorized as Class C carcinogens to ascertain how these substances are classified by other authorities. 19 of the 23 have been evaluated by IARC, and of these 19, IARC has placed 7 in its category 2B and 12 in category 3. RI DEM has changed the annual average AALs for the 12 C carcinogens that are in IARC category 3 so that they are no longer based on cancer but will continue to regulate the 7 IARC category 2B substances as such. Note that five of these seven substances are also listed by CAL as "Known to the State of California to Cause Cancer" and three of the seven are listed by the National Toxicology Project as "Reasonably Anticipated to Be Human Carcinogens." Of the four listed EPA Cancer Class C substances not classified by IARC, one, ethylidene dichloride, is on the CAL list and RI DEM has continued to regulate that substance as a carcinogen. The other three are not listed by CAL or NTP; RI DEM has changed the annual average AALs for those substances so that they are not based on cancer. This information is displayed for the 23 Class C carcinogens in Table B below.

The MQs were adjusted as necessary to correspond with the changes in AALs.

AALs and MQs for Specific Substances

Comment: "Cadmium" is misspelled in the Appendix A table in Regulation 9. (Teknor)

Response: This typographical error was corrected.

Comment: The AAL for antimony had a large change from in the original regulation (40 $\mu g/m^3$ as an annual average in the original list to 0.2 $\mu g/m^3$ as a 24-hour average for all antimony compounds and, in addition, an annual average AAL of 0.02 $\mu g/m^3$ for antimony trioxide). Is this technically valid? (Teknor)

Response: The 2002 proposed amendments to Regulation 22 listed a 24-hour average AAL for antimony of 0.1 $\mu g/m^3$, which was derived by dividing the EPA oral reference dose (RfD) for this compound, converted to an inhalation concentration, by a safety factor of ten, as per the AAL derivation methodology in the Guideline. A commenter to that proposal suggested that it would be preferable to use the EPA RfC for antimony trioxide (0.2 $\mu g/m^3$) for all antimony compounds and that suggestion was adopted into the current proposal.

In its discussion of the antimony trioxide RfC, EPA says that "particle size and distribution determine the initial deposition in the respiratory tract, and subsequent clearance depends on the deposition site, rate of absorption, dissolution, extent of metabolism, and tissue distribution. Retention reflects the difference between deposition and clearance. The toxic effects of antimony

compounds also will vary according to these and other variables…… Hence, the antimony trioxide RfC is not representative of the entire class of antimony compounds and should not be used in this manner." However, the discussion goes on to say that "Most atmospheric releases of antimony result from high-temperature industrial processes that produce antimony oxides. An RfC was derived separately for antimony trioxide because it is the primary form of antimony in the atmosphere and because there are limited toxicological data for other forms of antimony." Given that there are no inhalation benchmarks for other antimony compounds, that most of atmospheric antimony is expected to be in the trioxide form and that use of converted oral RfD for antimony yields a similar (and slightly more stringent) AAL, RI DEM believes that use of the antimony trioxide RfC for all antimony compounds is justified.

Comment: What is the technical reason for the big difference between the 24-hour AAL (0.1 $\mu g/m^3$) and the annual AAL (0.00008 $\mu g/m^3$) for chromium VI particulate? (Teknor)

Response: The AALs for the two averaging times are based on different health effects – noncancer respiratory effects (24-hour AAL) and lung cancer (annual AAL). Note that, since the RfC for chromium VI particulate met the criteria discussed above to be associated with an annual average, the 24-hour AAL has been changed to the ATSDR intermediate REL for this substance, 1 $\mu g/m^3$.

Comment: "Phosphorus" in Tables I and II should be changed to "Phosphorus, white" because that is the material on which the AAL is based. (ESS Group, Inc. (ESS))

Response: "Phosphorus" was changed to "Phosphorus, white" in Tables I and II in response to this comment. The substance was listed with the "white" qualifier in Table III of proposed amended Regulation 22 and in Regulation 9, but, in error, was not in the other two tables.

Comment: A commenter on the previous proposal stated that acetone should not be included on Rhode Island's list of air toxics because it is not a HAP and is not included in California's list of air toxics. RI DEM replied that "it is appropriate to list this commonly used substance so that impacts can be evaluated and to obviate the need to develop case-by-case CAALs for preconstruction permit reviews." Since there is no clear health-based rationale for including acetone on the list, it appears the RI DEM has done so simply to lessen the administrative burden on RI DEM permitting staff. This is not an appropriate reason for inclusion and acetone should be removed from the list. (Clariant) Acetone should not be listed as an toxic air contaminant. Acetone has low acute and chronic toxicity and numerous state authorities, including California, have concluded that it should not be regulated as an air toxic. Further, EPA has exempted acetone from its VOC definition because of its very low contribution to ozone formation. If RI lists acetone as an air toxic, it will discourage facilities from using it instead of more toxic HAPs or VOCs. If acetone is listed, the AALs and MQs are too stringent. The one-hour AAL is based on the ATSDR acute MRL of 26 ppm; the draft EPA Acute Exposure Guideline Level of 200

ppm for up to 8-hour should be fully protective. The 24-hour AAL, 13 ppm, is based on the ATSDR intermediate and chronic MRLs; based on pharmacokinetic modeling, an appropriate chronic RfC would be 29 ppm. Alternatively, the acute ATSDR MRL of 26 ppm could be used for a 24-hour concentration because ATSDR uses it with an averaging time of 1 – 14 days. If those values were used with the equations in the RI Air Toxics Guideline, the MQ would be 166,075 pounds per year, as opposed to 20,000 pounds/year currently proposed. The MQ should not be artificially capped at 36,500, as was done with other listed toxics. (ACC).

Response: RI DEM does not agree that including a substance like acetone as a listed air toxic contaminant necessarily discourages use of that substance. Like the EPA, RI DEM has exempted acetone from its definition of VOC, so the acetone content of coatings and other VOC-content regulated materials is not restricted. Since the AALs for acetone are not stringent, considerably larger quantities of emissions of this substance would be allowed than with other listed air contaminants, and thus it would remain a viable substitute for more toxic materials.

The RI Air Toxics Guideline states that substances are to be included on the air toxics list if they meet one or more of five listed criteria. Acetone meets the fifth criterion:

> The substance is emitted in Rhode Island by one or more stationary sources **and** an inhalation and/or oral health benchmark is available for the substance on EPA's IRIS database (RfC, Reference Dose (RfD) or cancer potency factor), from the Agency for Toxic Substances and Disease Registry (ATSDR), (oral or inhalation Minimal Risk Level (MRL)), and/or from CAL (inhalation REL or cancer potency factor).

The ATSDR acute MRL derivation is based on a one-time 4-hour human exposure. That MRL includes a safety factor of only nine, three for the use of a minimal LOAEL (neurological effects on auditory discrimination and increased anger) and three to account for variations in human sensitivity. AEGLs are derived to be used to evaluate accidental releases. Since such releases are not expected to occur on a regular basis, the AEGLs and are generally somewhat higher than then the acute benchmarks derived by the ATSDR and CAL, which are designed to be protective of routine releases. Since the Rhode Island regulation is aimed at routine releases, RI DEM believes that the ATSDR acute MRL is an appropriate basis for the one-hour AAL.

The ATSDR intermediate and chronic MRL is based on a human study involving exposures to acetone 1-7.5 hours/day, 2-5 days per week for six weeks. While ATSDR used uncertainty factors of 10 for the use of a LOAEL for changes in visual response and 10 for human variability, there was no time adjustment factor applied to account for longer or chronic exposure. RI DEM does not believe that this MRL is inappropriate for use as a 24-hour AAL.

The MQ of 20,000 pounds is a threshold for reporting emissions of acetone but, in most cases, a facility could emit a considerably larger quantity without exceeding the AALs for acetone. Further, even if acetone were not listed as a toxic air contaminant, it would still be considered an air contaminant if Regulation 9, and thus new or modified sources having the potential to emit 10 or more pounds per hour or 100 or more pounds per day of acetone would be required to obtain a preconstruction permit. The 100 pound per day permitting threshold is the origin of the 36,500 pound per year cap in the MQs.

The AALs for acetone, which are based on ATSDR RELs, are not stringent and shouldn't require emissions reductions in most if not all cases. However, RI DEM believes it is appropriate to list this commonly used substance so that impacts can be evaluated, to obviate the need to develop case-by-case CAALs for preconstruction permit reviews and so the regulated community is aware of the AAL. The regulation was not changed in response to this comment.

Comment: A commenter on the previously proposed amendments stated that the "MQ for chlorine could affect homeowners with swimming pools or bleaching clothes." RI DEM replied that homeowners are exempt and that "since this is quite a toxic substance, RI DEM believes that this (20 lbs/year) is an appropriate threshold. This is an unscientific basis for setting a threshold. (Clariant)

Response: The chlorine MQ, like the other MQs, was derived by the method specified in the Guideline. The MQ for chlorine is based on the annual average AAL for that substance.

Comment: RI DEM has proposed a one-hour AAL of 300 $\mu g/m^3$ and a 24-hour AAL of 100 $\mu g/m^3$ for ammonia. The 24-hour number is based on the EPA RfC and includes a safety factor of 90, which isn't necessary for a simple irritant. The acute California REL, 3,000 $\mu g/m^3$, is reasonable. There is no need for a chronic number. (Clariant)

Response: The one-hour AAL proposed for ammonia is 1,000 $\mu g/m^3$, not 300 $\mu g/m^3$, as stated in the comment. That value is the ATSDR acute MRL for ammonia. That value was chosen over the CAL acute number because the Guideline directs that the more stringent of the ATSDR or CAL acute numbers should be used for the one-hour AAL if both are available. RI DEM does not agree with the commenter that no chronic limit is necessary; in addition to the RfC, both CAL and the ATSDR have developed chronic limits for this substance. However, since the ammonia RfC meets the criteria presented above to be considered an annual average, the 24-hour average AAL was deleted and the RfC (100 $\mu g/m^3$), has been changed to be an annual average AAL.

Comment: The proposed annual average AAL for aniline, 0.02 $\mu g/m^3$, is overly protective. The California NSRL, 5 $\mu g/m^3$, is adequate. (Clariant)

Response: The proposed annual average AAL for aniline is 0.6, not 0.02 $\mu g/m^3$. As discussed above, the NRSL is based on a 10^{-5} risk while Table I annual average AALs for carcinogens are based on a 10^{-6} risk level. The risk analyses done by both EPA and CAL yielded the same10^{-6} risk level, which was used as the annual average AAL. Also, as mentioned previously, the NSRL considers exposures from all exposure routes and all sources, not just inhalation of emissions from a particular facility.

Note that annual average AALs based on cancer risk in Table 2 (AALs for LAER sources) correspond to a risk level of 10^{-5}. Since, in the case of aniline, the concentration corresponding to a 10^{-5} risk is higher than the non-cancer based 24-hour concentration, no annual average AAL is listed in Table 2 for aniline. The AALs for aniline were not changed in response to this comment.

Comment: The annual average AAL (0.02 $\mu g/m^3$) for o-anisidine should not be more stringent than the California NRSL of 0.25 $\mu g/m^3$. Data on non-cancer effects also do not support a lower AAL. (Clariant)

Response: As discussed above, the NRSL is based on total exposure and corresponds to a 10^{-5} risk level while the Rhode Island AAL addresses only inhalation exposure associated with a particular source and is based on, for Table I, a 10^{-6} risk level and, for Table II (LAER sources), a 10^{-5} risk level. For that reason, the Table II AAL is equivalent to the NRSL, rounded to one significant digit, and the Table I AAL is ten times more stringent. The AAL for o-anisidine was not changed in response to this comment.

Comment: The annual average AAL for carbon tetrachloride, 0.07 $\mu g/m^3$, is too stringent. Evaluation of cancer potency for this substance should use a threshold model rather than the linear multistage model because it is not genotoxic. IARC has determined that it is carcinogenic to animals but that there is inadequate evidence to say that it causes cancer in humans. Rhode Island should use CAL's chronic non-cancer benchmark, 40 $\mu g/m^3$, as an AAL or, if cancer is a major concern, should use the CAL NRSL of 0.25 $\mu g/m^3$. (Clariant)

Response: Carbon tetrachloride is classified by IARC in Group 2B (possibly carcinogenic to humans), by the US EPA as Group B2 (probable human carcinogen) and by the National Toxicology Program as "Reasonably Anticipated to be Human Carcinogens." The EPA 10^{-6} risk level for this substance is actually is approximately three times less stringent than the CAL number.

As discussed previously, the California NRSL is based on total exposure and corresponds to a 10^{-5} risk level while the Rhode Island AAL addresses only inhalation exposure associated with a particular source and is based on, for Table I, a 10^{-6} risk level and, for Table II (LAER sources), a 10^{-5} risk level. Since the Rhode Island AAL is based on the less stringent EPA cancer potency, the Table I AAL for this substance, 0.7 $\mu g/m^3$, is approximately three times more stringent than

the NRSL and the Table II AAL, 0.07 μg/m^3, is approximately three times less stringent than the NRSL. The AALs for carbon tetrachloride were not changed in response to this comment.

Comment: RI DEM should have used the California chronic REL instead of the EPA oral RfD to develop an AAL for chlorobenzene. (Clariant)

Response: RI DEM agrees that the inhalation benchmark should have taken precedence, and has changed to AAL in the Guideline and Regulation 22 to 1,000 μg/m^3 as an annual average and the MQ in the Guideline and Regulations No. 9 and 22 to 20,000 pounds per year (the ten ton permitting limit for HAPs).

Comment: The AALs for chloroform for all three averaging times are inappropriate. The one-hour AAL is based on the California Acute REL of 150 μg/m^3, which is for a 7-hour exposure and thus should be upwardly adjusted by at least a factor of three (to 450 μg/m^3) if used as a one-hour limit. The 24-hour AAL (3 μg/m^3) is derived by dividing EPA's oral RfD by a factor of ten. Since RfDs are for long-term daily exposure, the RfD should be upwardly adjusted by at least a factor of three (to 150 μg/m^3) to be used as a 24-hour limit. This limit would also be protective for inhalation exposures, considering available inhalation study results and the fact that chloroform is well absorbed by both routes. The annual average AAL (0.04 μg/m^3) is based on a linear multistage extrapolation of animal cancer data. However, IRIS now reflects EPA's current belief that chloroform is unlikely to be carcinogenic in humans except at levels that cytotoxicity occurs, suggesting that threshold assumptions are more appropriate and that the non-cancer RfD would be protective for cancer effects as well. California has developed a chronic inhalation REL of 300 μg/m^3 for chloroform but, since this is higher than the recommended 24-hour AAL, both the 24-hour and annual average AAL should be set at 150 μg/m^3.

Response: Rather than attempting to adjust the California Acute REL which, as the commenter states, is associated with a 7-hour exposure, RI DEM has added a footnote to that value in Tables I and II of Regulation 22 to indicate that this value should be compared to a 7-8 hour average concentration. For the 24-hour average concentration, RI DEM will use the ATSDR intermediate inhalation MRL instead of adjusting the oral RfD. Since this would generate a 24-hour value higher than the one-hour value, it will not be listed in the regulation.

As the commenter states, EPA's current IRIS record contains a toxicological review that suggests that chloroform's carcinogenic activity may be a threshold effect. Further, EPA has noted in the section of the main IRIS document that deals with quantitative cancer risk associated with inhalation exposure that the listed potencies do not reflect current data and are now under review. On the other hand, California is continuing to advocate use of its cancer risk number, which is approximately five times less stringent than EPA's and is also derived from a linear extrapolation model and the NTP and IARC continue to list chloroform in their current documents as reasonably anticipated to be a human carcinogen and possibly carcinogenic to

humans, respectively. There also appears to be some evidence of genotoxicity associated with chloroform and some difference of opinion within the scientific community of the significance of those effects to low dose extrapolation.

Given that uncertainty and the fact the EPA has not finalized its reanalysis, RI DEM is not at this time ready to discard the annual average AAL based on the non-threshold cancer assumption. However, since EPA appears to have reservations about its current cancer risk levels, RI DEM will instead utilize the California risk levels in the regulation. This will result in a Table I annual average AAL of 0.2 $\mu g/m^3$ and a Table II annual average AAL of 2 $\mu g/m^3$. These values will be reevaluated at the first periodic review of the AALs.

Comment: The ten-fold adjustment inter-route adjustment of the EPA RfD for 1,2-dichlorobenzene is not appropriate. This substance is well absorbed both through the lungs and the GI tract and studies do not show enhanced toxicity by the inhalation route. In addition, it is inappropriate to use the RfD as a 24-hour average concentration; if applied to that averaging time, it should be upwardly adjusted by at least a factor of three. This would still give an adequate Margin of Exposure safety. Therefore, the 24-hour AAL should be 1000 $\mu g/m^3$. (Clariant)

Response: As discussed above, RI DEM has agreed to not use a factor of ten adjustment when using an oral benchmark as the basis of an AAL but has decided that AALs derived from RfDs should continue to be associated with a 24-hour averaging time because of the uncertainties inherent in using oral benchmarks as the basis of inhalation limits. Consequently, the 24-hour AAL for 1,2-dichlorobenzene has been changed to the RfD for that substance, converted to an air concentration, 300 $\mu g/m^3$. This change results in a MQ for this substance of 900 pounds per year.

Comment: The proposed AALs for hydrogen chloride are too stringent. The RfC should not be used as a 24-hour average and is, as derived by EPA, too stringent. A more appropriate RfC would be 60 $\mu g/m^3$, rather than the 20 $\mu g/m^3$ value derived by EPA, and it should have an annual average. A 24-hour value could be derived by dividing California's acute REL by 10, for an AAL of 210 $\mu g/m^3$. (Clariant)

Response: RI DEM is continuing to use the CAL acute REL as a one-hour AAL for this substance. The RfC does not meet the above criteria for use as an annual AAL because the CAL chronic MRL is more stringent than the RfC. However, the RfC is based on the same study as the CAL REL, a lifetime, intermittent exposure animal study and the benchmarks derived by the two agencies (20 $\mu g/m^3$ for EPA and 9 $\mu g/m^3$ for CAL) are different due to a more stringent assumption about relative lung surface areas by CAL and a more stringent LOAEL to NOAEL conversion factor in the EPA derivation. Therefore, it appears that the annual averaging time is appropriate. Since RI DEM is not equipped to determine whether the EPA or CAL extrapolation assumptions are more appropriate, the annual average concentration will continue to be based on

the more conservative CAL REL. The 24-hour AAL has been removed.

Comment: Instead of adopting the CAL acute REL for isopropanol of 3,000 μg/m^3, which is actually higher than California's chronic REL for this substance, 7,000 μg/m^3, RI DEM should adopt a one-hour AAL of 40,000 μg/m^3, the CAL chronic REL as an annual average and a 24-hour AAL that is in between these values. (Clariant)

Response: RI DEM is not equipped to recalculate health benchmarks derived by EPA, CAL and ATSDR. The AAL for isopropanol was not changed in response to this comment.

Comment: The 24-hour AAL for methyl chloride should not be more stringent than the ATSDR intermediate MRL 400 μg/m^3. It should not be based on the EPA RfC (90 μg/m^3) because that value is overprotective even for chronic exposure. (Clariant)

Response: Since the methyl chloride RfC meets the criteria specified above, the RfC has been changed to an annual average AAL. The 24-hour AAL is now based on the ATSDR intermediate MRL for this substance.

Comment: The CAL OEHHA website does not list the chronic REL for sodium hydroxide identified in the Rhode Island Guideline and used for the Rhode Island annual average AAL. Further, the CAL acute REL of 8 μg/m^3, which was used by Rhode Island as a one-hour average AAL, was improperly derived. A 16 μg/m^3 acute value is more appropriate and should also be used for the 24-hour and annual time periods. (Clariant)

Response: RI DEM used California numbers from two sources, both of which are frequently updated, the Office of Environmental Health Hazard Assessment (OEHHA) web pages (http://www.oehha.ca.gov/air/hot_spots/index.html) and the California Air Resources Board (CARB) Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values (http://www.arb.ca.gov/toxics/healthval/contable.pdf). The Consolidated Table lists OEHHA values preferentially, but also includes some older values. In the case of sodium hydroxide, the chronic REL is in the latter category. These values are also presented on CARB's Toxic Air Contaminant Fact Sheet for this substance, which is available at http://arbis.arb.ca.gov/toxics/tac/toctbl.htm. As discussed previously, RI DEM is not equipped to recalculate benchmarks developed by EPA, CAL or ATSDR. The regulation was not changed in response to this comment.

Comment: It is appropriate for RI DEM to adopt the California acute and chronic RELs for sulfuric acid and oleum, as proposed, but the regulation should specify that those values apply only to respirable aerosols of the acid. (Clariant)

Response: The regulation was not changed in response this comment. The studies cited by California in the support document for its acute and chronic RELs do not specify aerosol diameter. Moreover, the documentation for the acute REL states that "Upon contact with atmospheric moisture, SO_3 (sulfur trioxide, a constituent of oleum) is rapidly converted to H_2SO_4 mist."

Comment: RI DEM lists a CAL chronic REL as a source for its annual average AAL for bromine and compounds. A chronic REL for inorganic bromine compounds is not on the CAL OEHHA website. Where did this value come from and which compounds are regulated by this limit? (Clariant) Does the listed category "Bromine and compounds (except Hydrogen bromide & Bromates)" include any compound containing Br_2 as well as other compounds with a single Br atom, such as Bromophenylmethane? The CAS number used for this category, 7726956, is for Br_2. (WC)

Response: The CARB Consolidated Table discussed above lists a chronic REL for bromine and compounds and a different value for hydrogen bromide. These values are documented in CARB's fact sheet for these substances, which is available at http://arbis.arb.ca.gov/toxics/tac/factshts/bromine.pdf. The CAS number listed is used for both molecular bromine, Br_2 and the elemental form Br. All Br containing compounds would be included in this category. To avoid confusion, the CAS numbers for all listed classes of compounds have been removed from the tables in the regulations.

Comment: The EPA RfC for chlorodifluoromethane should have been adopted as an annual, rather than a 24-hour AAL. (Clariant)

Response: The RfC for chlorodifluoromethane does not meet the criteria specified above to be associated with an annual average, and, therefore, RI DEM did not change the averaging time for the AAL derived from that benchmark. Neither CAL nor ATSDR have developed comparable benchmarks for this substance.

Comment: The Rhode Island Guideline says that the AAL for 3,3'-dichlorobenzidine is based on the CAL risk number, but this number is inconsistent with the NRSL for this substance. (Clariant)

Response: RI DEM used the cancer potency currently cited on CAL OEHHA's Toxicity Criteria Website, 0.00034 $(\mu g/m^3)^{-1}$, to derive the 10^{-6} risk value for this substance used in Table I, 0.003 $\mu g/m^3$, and the 10^{-5} value in Table II, 0.03 $\mu g/m^3$. This methodology is consistent with the Rhode Island Guideline. The regulation was not changed in response to this comment.

Comment: The ethylene glycol AALs should be 5,000 $\mu g/m^3$ for all averaging periods. The

ATSDR acute MRL, which was used for the one-hour AAL, is inappropriately derived and should not be applied to a one-hour averaging period. The RfD should not be adjusted by a factor of ten and should not be used as a 24-hour average. The CAL chronic REL, which was used for the annual average, is too stringent. (Clariant)

Response: As stated previously, RI DEM is not equipped to recalculate health benchmarks calculated by ATSDR, California or EPA and appropriately used the ATSDR acute and CAL chronic benchmarks for the one-hour and annual average AALs, according to the methodology specified in the Guideline. As discussed above, RI DEM has agreed to not use a factor of ten inter-route correction factor when using converted oral benchmarks. The RfD for this substance without that factor would be higher than the one-hour AAL, which was derived from an inhalation benchmark and thus takes precedence. Therefore, the 24-hour AAL for this substance was removed from the Guideline and regulation.

Comment: EPA and CAL both used inappropriately high safety factors when deriving their health benchmarks for phosphoric acid. A more appropriate value for an annual AAL for this substance would be 30 $\mu g/m^3$ and for one and 24-hour AALs about 100 $\mu g/m^3$. (Clariant)

Response: As stated previously, RI DEM is not equipped to recalculate health benchmarks calculated by the ATSDR, CAL or the EPA. The phosphoric acid RfC does not meet the above criteria to be considered as an annual average because it is slightly higher than the CAL chronic REL (10 $\mu g/m^3$ RfC as compared to a 7 $\mu g/m^3$ REL). However, these two benchmarks were based on the same study and were calculated using very similar methodologies to derive very similar numbers. Therefore, RI DEM determined that an annual averaging time is appropriate for the RfC and has removed the 24-hour AAL. Since the CAL REL is slightly more conservative than the RfC, RI DEM will continue to use that value as the annual average AAL.

Comment: The lowest number for any of the AALs for xylenes should be 700 $\mu g/m^3$. RI DEM does not mention that there is the CAL chronic REL but instead used the EPA RfC, which is 7 times lower and less appropriate. (Clariant)

Response: The CAL REL and the ATSDR chronic REL of 441 $\mu g/m^3$ for xylenes are both listed in Table B of the Guideline. However, in keeping with the protocol for deriving AALs delineated in that Guideline, the EPA RfC was selected as the preferred value. Since the RfC for xylenes meets the criteria specified above, it has been changed to be an annual average AAL. The 24-hour average AAL for this substance is now based on the ATSDR intermediate MRL, which is 3,000 $\mu g/m^3$.

Comment: The RfCs for TDI and MDI would be conservative values for annual average AALs. Using them as 24-hour AALs without an adjustment is excessively conservative and unjustified. (ACC)

Response: RI DEM agrees that these RfCs meet the above specified criteria and therefore can appropriately be applied to an annual average. The CAL chronic RELs for these substances are derived from the same studies as the RfC values are and are similar or identical to these values. The AALs and MQs for TDI and MDI were changed in response to this comment.

Comment: Propylene is not a HAP and is not listed as an air toxic in California. California did derive a chronic REL for this substance, but there is no underlying health concern that would justify RI DEM listing it as a toxic air contaminant. The high calculated MQ for this substance further demonstrates that it should not be listed. If it is listed, the AAL should be 40 – 130 mg/m^3 instead of the CAL REL of 3 mg/m^3. (ACC)

Response: As the commenter states, propylene was listed because CAL has developed an inhalation benchmark for this substance. In accordance with the methodology specified in the Guideline, the CAL REL, the only available health benchmark from the agencies consulted, was used as an annual average AAL. Since this AAL is very lenient, the MQ is high and it is unlikely that any source's emissions of this substance would be restricted beyond any restrictions associated with it being a VOC. The regulation was not changed in response to this comment.

Comment: Methyl ethyl ketone (MEK) and methyl isobutyl ketone (MIBK) should not be listed toxic air contaminants. EPA has proposed to delist MEK from its HAP list. The new IRIS RfCs for these substances reflect their low toxicity and listing them would discourage environmentally beneficial uses. If listed, the RfCs should be used as annual averages, not 24-hour averages and the MQs should be substantially higher than those proposed. (ACC)

Response: Even if MEK is removed from the HAP list, it will still meet the criteria for inclusion on the Rhode Island toxic air contaminant list because it has a CAL-derived acute MRL and an IRIS RfC and has been evaluated in recent Rhode Island air permits. Similarly, in addition to being a HAP, MIBK has an IRIS RfC and has been evaluated in recent Rhode Island air permits. The proposed AALs are consistent with the updated IRIS RfCs for these substances.

The RfCs for both MEK and MIBK are based on developmental effects and are derived from studies in which rodents were exposed to vapors of the substance for seven hours per day for ten gestational days. EPA does not use a subchronic to chronic conversion factor when developing a RfC based on developmental effects. Since development is affected by concentration at critical periods of gestation, it is not appropriate to associate benchmarks based on this effect with an annual averaging period. The regulation was not changed in response to this comment.

Comment: Isophorone should not be regulated as a possible cancer hazard. It should be regulated using the RfD, without adjustment, as an annual average AAL. (ACC)

Response: As previously discussed, RI DEM has modified the regulation so that isophorone is not regulated on the basis of cancer and has removed the adjustment factor for converting a RfD to an inhalation AAL. Because of the uncertainties involved with using an ingestion benchmark to derive an AAL, however, the 24-hour averaging time was retained.

Comment: The RfC for 1,6-hexamethylene diisocyanate (HDI) should be used to derive an annual average AAL. The RfC should be increased by a factor of three because the derivation of that value, which was added to IRIS in 1994, includes an uncertainty factor of three "for the absence of developmental/reproductive studies." Since then, reproductive and teratogencity studies have been completed under an enforceable consent agreement with EPA and no reproductive or developmental effects were observed, even at maternally toxic levels. (ACC)

Response: The RfC for HDI meets the criteria cited above and so RI DEM agrees that it should be used as an annual average. The RfC has been replaced by the ATSDR intermediate MRL as the 24-hour AAL. The annual average AAL was changed to three times the RfC in response to the comment. This value (0.03 $\mu g/m^3$) is lower than the ATSDR chronic MRL for this substance (0.07 $\mu g/m^3$).

Table A Averaging Time Considerations for RfCs

Substance	Chronic MRL/REL	Subchronic MRL	Developmental-Based RfC?	Annual Average?
Acetaldehyde	same	none	no	yes
Acetonitrile	none	none	no	no
Acrolein	higher	same	no	no
Acrylonitrile	higher	none	no	yes
Acrylic acid	none	none	no	no
Allyl chloride	none	none	no	no
Ammonia	higher	none	no	yes
Aniline	none	none	no	no
Antimony/antimony trioxide	none	none	no	no
Arsine	none	none	no	no
Benzene	higher	lower	no	no
Beryllium	lower	none	no	no
1,3-Butadiene	higher	none	no	yes
Carbon disulfide	higher	none	no	yes
Chlordane	lower	lower	no	no
Chlorine dioxide	higher	none	no	yes
2-Chloroacetophenone	none	none	no	no
1-Chloro-1,1-difluoroethane	none	none	no	no
Chlorodifluoromethane	none	none	no	no
Chromium VI-mists	lower	lower	no	no
Chromium VI – particulate	higher	higher	no	yes
Cumene	none	none	no	no
Cyclohexane	none	none	no	no
1,2-Dibromo-3-chloropropane	none	higher	no	no
1,4-Dichlorobenzene	lower	higher	no	no
1,3-Dichloropropene	lower	lower	no	no
Dichlorvos	same	higher	no	no
1,1-Difluoroethane	none	none	no	no
Dimethylformamide	higher	none	no	yes
Epichlorohydrin	higher	none	no	yes
1,2-Epoxybutane	Same	none	no	yes
Ethyl benzene	Higher	higher	yes	no
Ethyl chloride	Higher	none	yes	no
Ethylene glycol monoethyl ether	Lower	none	no	no
Ethylene glycol monomethyl ether	Higher	none	no	yes
Hexachlorocyclopentadiene	Higher	higher	no	yes
Hexamethylene-1,6-diisocyanate	Higher	higher	no	yes
Hexane	Higher	none	no	yes
Hydrogen chloride	Lower	none	no	*

Substance	Chronic MRL/REL	Subchronic MRL	Developmental-Based RfC?	Annual Average?
Hydrogen cyanide	Higher	none	no	Yes
Manganese	Lower	none	no	No
Mercury	Lower	none	no	No
Methyl bromide	Same	higher	no	Yes
Methyl chloride	Higher	higher	no	Yes
Methylene diphenyl diisocyante	Higher	none	no	Yes
Methyl ethyl ketone	Lower	none	yes	No
Methyl isobutyl ketone	None	none	yes	No
Methyl methacrylate	None	none	no	No
Methyl tert-butyl ether	Lower	lower	no	No
Naphthalene	Higher	none	no	Yes
Phosphine	Higher	none	no	Yes
Phosphoric acid	Lower	none	no	*
Propylene dichloride	none	higher	no	No
Propylene oxide	same	none	no	Yes
Styrene	lower	none	no	No
1,1,1,2-Tetrafluoroethane	none	none	no	No
Toluene	lower	none	no	No
2,4 and 2,6-Toluene diisocyante	same	none	no	Yes
Triethylamine	higher	none	no	Yes
Vinyl acetate	same	lower	no	No
Vinyl bromide	none	none	no	No
Vinyl chloride	lower	lower	no	No
Vinylidene chloride	lower	lower	no	No
Xylenes	higher	higher	no	Yes

*See specific discussions above about phosphoric acid and hydrogen chloride.

Table B – EPA Class C Carcinogens Listed in Regulation No. 22

	Listed by NTP?	Listed by CAL?	RI Regulation 22 Carcinogen?
IARC Class 2B			
1,4-Dichlorobenzene	yes	yes	Yes
beta-Hexachlorocyclohexane	yes	yes	Yes
Hexachloroethane	yes	yes	Yes
Methyl mercury		yes	Yes
Naphthalene		yes	Yes
Styrene			Yes
Vinyl acetate			Yes
IARC Class 3			
Allyl chloride		delisted	No
Butyl benzyl phthalate			No
Dibromochloromethane		delisted	No
Hexachlorobutadiene			No
Mercuric chloride			No
Parathion			No
Pentachloronitorbenzene			No
1,1,1,2-Tetrachloroethane			No
1,1,2,2-Tetrachloroethane		yes	No
1,1,2-Trichloroethane		yes	No
Trifluralin			No
Vinylidene chloride			No
No IARC Classification			
Cresols			No
Ethylene glycol monobutylether			No
Ethylidene dichloride		yes	Yes
Isophorone			No